

Research and disciplinary differences versus funding allocation in New Zealand's higher education system

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This study adds to the debate that both basic and applied research enhance each other; likewise, the arts and science disciplines are equally relevant in solving complex societal and environmental problems. Thus, investment in one should not lead to a deprivation of the other. One may suppose that although both basic and applied research remains a top priority of universities, funding opportunities are shifting more focus to applied research to the disadvantage of basic research. When academics engage in applied research, it does not mean they are ignoring basic research. However, pursuing funding opportunities sometimes compromise research autonomy because most external funds come with strings attached, such as influencing what research is done – basic research or applied research or elements of both. The study uses four faculties in two New Zealand universities as a case study based on Biglan's (1973) classification of academic disciplines, as their differences can influence the nature of research and funding support. It recommends that university administrators and funding institutions avoid the shift in access to resources that deepens the imbalance between the arts and science disciplines.

Introduction

The source and nature of research funding can suppress the publication of research outcomes and determine what research academics do. Pells (2019) reported that university-business interactions in Europe are leading to less focus on basic research. In a report by the European University Association titled *The role of universities in regional innovation ecosystems*, universities in Europe were warned of the “biased results” of industry-funded research (Reichert, 2019). In the report, nine universities from nine European countries were selected because they were “known to be competitive” in research and innovation. They were asked in-depth questions about their challenges, assets and strategies in university-business interactions. It found that there are fears from academics that increased reliance on industry-funded research often leads to biased results and the possibility of curiosity-based or basic research being undermined. The report concluded that universities in Europe have seen increased industry-funded research but not in public funding for curiosity-driven research (Reichert, 2019).

Thus, a key impact of external research funding is that it can influence university research to focus on applied research at the expense of basic research, because when industry funds university research, they usually want specific problems to be solved (Sarpong *et al.*, 2020). Furthermore, external funders usually revere the hard disciplines like engineering and medicine and tend to overlook soft disciplines like the arts and humanities (Becher & Trowler, 2001). In 2013, student numbers at the University of Auckland's Arts Faculty went down below enrolment targets after the University increased entry requirements, which was a response to the government funding only an agreed number of students (Jones, 2013). However, more funding was allocated to ensure significant growth in the

STEM subjects (science, technology, engineering and mathematics) – such promotion undoubtedly strengthens the STEM-humanities culture war. According to the then Tertiary Education, Skills and Employment Minister, Steven Joyce, the approach was sensible because the STEM subjects produce commercially viable output (Jones, 2013) – that is true but could encourage an instrumental approach to knowledge if not well designed (Adelekan, 2020). A recent study by Sarpong (2021) confirmed that this academic stratification still prevails in the New Zealand (NZ) higher education system. Therefore, this study focuses on the NZ context to understand how the nature of research and discipline influences funding allocation in the universities and how funding also influences the nature of research and disciplines that universities pursue.

The study is organised as follows. The first section examines whether there is a shift from basic to applied research and how disciplinary differences influence funding allocation. Description of some methodological choices is the focus of the second section. The findings and discussion sections argue how epistemic drift may dehumanise and damage a reflexive and civilised society. The study concludes that the knowledge economy requires elements of all research and disciplines.

Epistemic differences and funding

While university-industry-government interaction is increasingly encouraged, one of the critical consequences could be an increased focus on applied research, to the disadvantage of basic research. Elzinga (1997) referred to this as an “epistemic drift”: a shift from an emphasis on internal quality control to external relevance assessments of research in contexts of intense political and commercial pressures within universities. Despite some arguments in the literature that basic research is no longer a focus of universities, a study by Bentley et al. (2015) concluded that there is a strong presence of basic research in universities, but that varies among countries and disciplines. It is partly why this study focuses on different university disciplines in the New Zealand context to see how the variation unfolds. Contrary to the notion that academics specialise either in basic or applied research (Gibbons et al., 1994), Bentley et al. (2015; see also Gersbach et al., 2018) discovered that most academics engage in both basic and applied research, with the applied orientation generally more common.

Basic research has traditionally been fundamental to university missions and their public funding (McLaughlin, 2003). The “linear model” of innovation, which was popular after the Second World War, regarded basic research as the key contributor to innovation and economic growth (Kaldewey & Shauz, 2018; Stokes, 2011). However, more recently, the value of basic research has come under question. Nowotny et al. (2003) proposed three leading causes for the decline in basic research: increased steering of research priorities by funders; increased commercialisation of research (resulting from decreased public funding); and broader research accountability to society. Gibbons et al. (1994, p. 184), as well as Kaldewey and Shauz (2018), argued that basic research conducted solely within universities is no longer the primary mode of knowledge production: “the research that is variously described as “pure”, “blue-skies”, fundamental, or disinterested, is now a

minority preoccupation – even in universities.” Hence, applied research has become the dominant form of research in universities (Bentley et al., 2015).

Another model that emphasises the shift away from basic to applied research is the *triple helix* model (Cai & Etzkowitz, 2020; Etzkowitz & Leydesdorff, 2000), which shows that the future legitimisation of research depends upon its application and contribution to economic development. Scholars have criticised this shift as academic capitalism (Jessop, 2018; Slaughter & Rhoades, 2004), whereby applied and commercially funded research is often fostered at the expense of basic research. Nevertheless, the extent of such engagement may be based on how close a discipline is to the market forces (Becher & Trowler, 2001). As Bentley et al. (2015) argued, the shift may vary according to country and discipline. In other words, while academics in one country may focus more on basic research, others in another country may prioritise applied research; and academics in the natural sciences may prioritise basic research compared to their counterparts in the applied sciences.

The level of government funding in each country may well play a key role in deciding the kind of research activities universities and their academics tend to engage in. For example, according to Kyvik (2007), public funding of university research is substantial in Norway, and as a result, the majority of Norwegian academics engage in basic research (Gulbrandsen & Kyvik, 2010). Contrary, about 50% of academics in Africa are without research funding, due to little government investment in research (Bothwell, 2018). Therefore, it would be easier for such academics to divert their research focus to areas where they could get funding (or not undertake research that requires funding). National context is of importance to appreciating changes in knowledge production. In NZ, though public research funding keeps rising, there are far more competitors for the funding, which compels the universities to seek industry funding. Though a greater percentage of public funding is for basic research, applied research is recently gaining more attention (Universities New Zealand, n.d).

Apart from the national context, one can expect specialisation in basic research to be prevalent in the hard-pure disciplines (e.g. physical sciences) and soft-pure disciplines (e.g. arts) (Becher & Trowler, 2001). On the contrary, specialisation in applied research may be more common in the hard-applied disciplines (e.g. medical and health sciences) and soft-applied disciplines (e.g. business). According to Biglan (1973) and Becher's (1994) discussions of disciplinary differences, academics focusing on basic research tend to receive less external research funding, work in environments where applied research is less emphasised, and feel weaker professional obligations to apply their knowledge to problems in society. For instance, a history professor is least likely to receive industry funding and apply their knowledge to practical societal problems than an engineering professor, due to the visibility of STEM disciplines and heightened economic glorification in recent times. Bentley et al. (2015) put forward three possible explanations for the extent to which academics specialise in either basic or applied or both research: access to external commercial research funding, institutional expectations/policies, and individual normative/social behaviour.

Bentley and colleagues (2015) discovered that external commercial research funding plays a significant role in applied research specialisation, but mostly not for basic research specialisation. In their study, those academics who engaged in both basic and applied research did not do so equally, as more academics leaned towards applied over basic research. Therefore, basic research may be considered an essential part of most academics' research, but mainly secondary to applied research. Regardless of country and discipline, combining basic and applied research may be the norm for many academics. The authors assert that there may not be a clear division in the higher education system between universities/academics primarily doing basic research and others applied research.

Bentley and colleagues' (2015) work is complemented by Reichert's (2019) report, which noted that once basic and applied research were widely understood as separate practices, now the two approaches are "generally seen as part of a mutually reinforcing whole." However, governments should not regard university-industry collaboration as an excuse to relax their own support because given that many university-industry collaborative projects are formed under a requirement to develop a specific commercial product, basic research might be ignored (Reichert, 2019).

Does pressure from the government and funding bodies encourage universities to pursue applied research (and hard disciplines) over basic research (and soft disciplines)? If so, what are the implications of this knowledge shift for the academic autonomy of universities and the broader society? These form the research questions for this study, which seeks to bridge a gap between applied and basic research, the arts and sciences, and encourage comprehensive universities.

Research design

Sampling procedure

I chose the University of Auckland (UoA) and Auckland University of Technology (AUT) among the eight NZ public universities to understand how a well-established research university (UoA) and a developing research university (AUT) manage their research relationships with external actors. Since both universities have many faculties, I selected four faculties: Faculty of Science; Faculty of Arts; Faculty of Medical and Health Sciences; and Business School. The selection was based on Biglan's (1973) classification of academic disciplines into "hard pure", "soft pure", "hard applied" and "soft applied." Becher (1994) argued that awareness of disciplinary differences is helpful to the conduct of research in higher education because there are specific characteristics of these disciplines, which may affect the nature of research and funding support.

According to Becher and Trowler (2001), research in hard pure fields (Faculty of Science) is liable to be expensive, giving rise to the need to look for external funding. When it comes to soft pure research (Faculty of Arts), the outside world tends to view much scholarly work as lacking any social relevance and not deserving any significant financial support. Hard applied fields (Faculty of Medical and Health Sciences) mainly use pragmatic research criteria. However, there is also a tendency to aim for high status by

favouring the more theoretical and less instrumental aspects of the domain (Becher, 1994). Finally, in soft applied disciplines (Business School), perceived relevance is a reliable indicator for determining funding support, making them vulnerable to external pressure (Becher, 1994). In short, not all faculties have the same ability to raise funds for their research because while some are attractive to funding bodies, others are not. For this reason, I assumed that awareness of disciplinary differences would provide the grounds to understand how different faculties are placed.

Contacting participants

The process of data collection began after getting ethics approval on 14 February 2019 from the University of Auckland Human Participants Ethics Committee. From April 2019 and through third parties, I sent emails to the targeted faculties and offices in both institutions. The faculties then sent a general email to the participants using the UoA and AUT faculty staff emailing system. One of the faculties would not send the general email. Instead, they offered a suggestion: "We try to restrict all-staff emails to matters of faculty business, so the best approach would be for you to identify individuals you would like to talk to and approach them directly." Thus, I sent a direct email to academics in the faculty.

Also, I adopted snowball sampling in the Business School in both universities, though it was not my initial plan. After the first interviews, participants were intrigued and wanted to know if I got enough participants. I responded No because it was hard reaching the targeted population. Many academics I had contacted were either busy with teaching, research, service or a combination of these duties. Thus, as proposed by Atkinson and Flint (2001), a snowball sampling technique should be used for identifying and contacting a population that is hard to locate. Through my earlier participants' help, getting the other participants became easier. I interviewed three categories of people in both Universities: senior academic research administrators (SARA), junior academic research administrators (JARA), and academics. While the SARAs oversee research across the Universities, the JARAs are the custodians of research in the faculties. I specifically targeted academics from certain faculties because I was more interested in how the disciplinary backgrounds of the participants influenced the nature of their research and funding-seeking behaviour.

The demographics

Guest et al. (2006) argued that at the research design stage, researchers need to plan how many interviews they wish to have before entering the field. My initial plan was to interview 34 staff: 24 academics – 3 from each faculty, and 10 from the management – 8 JARAs and 2 SARAs, as shown in Appendix A. Appendix B also shows the actual number of interviews, 26, that I conducted, while Appendix C is their assigned codes to be used in reporting the findings. According to Guest et al. (2006), due to factors including hard-to-reach participants, "[a]ppplied researchers are often stuck with carrying out the number of interviews they prescribe in a proposal, for better or worse" (p. 61). Conducting 26 interviews instead of the 34 did not affect the study's purpose. Generally, participants from each faculty shared similar views, which rendered additional interviews less relevant.

The interviews were semi-structured and used open-ended questions to seek responses from the participants (Appendix D). The documents used included the strategic plans of the universities; policies, guidelines and procedures; annual reports of the universities; National Statement of Science Investment 2015-2025; and University newsletters. I adopted Braun and Clarke's (2006) inductive thematic analysis approach to analyse the data. It involves identifying and reporting patterns (themes) within the data. I triangulated data from the interviews with the documents to analyse each theme and triangulated responses from the different categories of participants.

Some findings

I organised the findings into associated themes – epistemic drift, strategic research, research goal and funding issues – that corresponded to the study's aim of exploring how funding bodies might influence the nature of research and discipline pursued in universities. I found that despite their different backgrounds, both AUT and UoA had similar research and disciplinary objectives and strategies to be comprehensive universities. However, there were differences among the faculties within the Universities.

Epistemic drift

Are New Zealand universities witnessing the action of “Gresham's law” in research? In economics, Gresham's law is a monetary policy that states that “bad money drives out good.” In the context of research, it is suggested that due to the financial incentives that come with pursuing certain research agenda, applied research may be driving out basic research. However, SARA1 argued that this issue might not apply to UoA, as the university is sensitive to the need to maintain a comprehensive university and to support “research excellence” and “research quality” across the full spectrum of their activities. He explained:

If you go back to previous years, one of our top research excellence awards was a philosopher in an area that is not a natural science. And we have, for example, quite major international funding out of the US supporting a team which includes our Professor of Theology, for example. So, there are a diversity of funding sources that we can tap into. Many of those are not highly prescriptive in terms of what they want people to work on. (SARA1)

Therefore, there may be no *primus inter pares* among the disciplines, and that there are funding opportunities for all or opportunities that need either little or no funding. Besides, Academic7 argued that, although in some countries, applied research may be driving our basic research, NZ seems to differ:

This is where New Zealand stands out as being quite different here, with the bigger Marsden fund funding purely basic research. You are having no relevance whatsoever; at least, it is not direct but vital. (Academic7)

But the percentage of the Marsden fund applications that get funded is about 11% (Royal Society NZ, 2020). The low success rate discourages many applicants from applying for

the funding. Some participants also disagreed with the issue of epistemic drift as they argued that there might be a blurred line between basic and applied research:

Applied is all quite a relative. If I speak with someone from the statistics department, they see my research as highly applied; the same place for computer scientists. If I speak with practitioners in a company, they find me highly theoretical. (Academic1)

What some people may consider as applied research may be regarded as basic research by others. Though data from the Universities New Zealand (n.d) website shows that public investment in basic research is currently above that of applied, the latter is increasingly gaining attention at the expense of the former (Sarpong, 2021). If national funding policies encourage more applied research than basic research, it is likely to influence the choices universities can make. JARA3 commented that the universities are also encouraging academics to pursue applied research at the expense of basic research:

People are trying to encourage the external research income, which pushes people away from where they might have fundamental questions and more towards where the opportunities are out there. But I think, on principle, most people would say that they probably are not discouraging basic research. But in practice, I think we do. (JARA3)

Basic research suffers because external research funders, especially industry, usually invest in research that has a direct impact. JARA2 shared some of the experiences of academics in her faculty:

I do have colleagues that say to me, "all I want to do is research this; this is what I am passionate about, but there is no way I am going to get funding for that. So, I am going to modify it slightly and then do this because this has implications for society, and I am going to try and get money to do that." (JARA2)

In AUT, SARA2 admitted that though they try to pursue both basic and applied research, applied ones are more:

We encourage all forms of research. I think the reality is that AUT probably does less basic research and more applied research. But we do not particularly direct people in either way. We are developing, at the moment, our research strategy. But I think we do tend to take an inclusive approach. We want colleagues to engage in research. We want colleagues to engage in meaningful research and research that has an impact. Sometimes that might be seen as industry facing or socially responsive research and less fundamental research. But AUT is, I think, more of an applied research university. (SARA2)

Comparable to technical universities such as Imperial College and MIT (Martin, 2012), AUT is more into applied research because, being a former polytechnic and now a technology university, most of their research is likely to be applied in nature. The increasing focus on applied research has resulted in what most participants referred to as "strategic research."

Strategic research

According to Irvine and Martin (1984 cited in Rip, 2004, p. 156), “Strategic research [is] basic research carried out with the expectation that it will produce a broad base of knowledge likely to form the background to the solution of recognized current or future practical problems.” Thus, strategic research is describing the rationale for one’s research and how it may produce specific applied outcomes. In response to meeting the research needs of the NZ government, such as *the 11 national science challenges*, including: a better start; ageing well; building better homes, towns and cities (NZ Government, 2019), the faculties, through their universities, act to address the challenges, as JARA2 said:

There are big challenges at the university level, and then, in response to that, we develop these research themes with the intention to cross departmental silos and try and build the collaborations that are needed to address some of these big challenges. (JARA2)

The universities build bridges through interdisciplinary programs to connect with their external stakeholders. Many participants argued that the universities engage in strategic research investment, which they say:

We will give you money to go and get more money from external funders. So, they do not want to hear about stuff that would not result in their path. So, the strategy is only to get more, which constraints you; it is not strategic in the sense that how do we fill existing research gaps? (JARA3)

The point is that some of the universities’ research funding is only seed money that must produce returns (returns on investment). For universities and academics to have increased funding may require them to diversify their funding sources. Hence, many participants believe that the NZ system encourages research diversification, as opposed to specialisation:

We have diversified a lot since we arrived in New Zealand. Now, about 30% of our research is an agricultural focus, and I had never worked on something like that before I came to New Zealand. Those projects are purely designed for trying to get industry money and interest. (Academic12)

Thus, the need for research funding could cause some academics to become many things to all people. A colleague in AUT also said that the NZ academic system is causing him to be more strategic in his academic career: “It has motivated me to become a little more pragmatic and more strategic about the research here in New Zealand” (Academic5). Funding allocation in NZ is among the factors that influence the kind of research academics do. Therefore, research and disciplines with little or no direct impact may be underfunded.

Research goal

Research needs the contribution of all disciplines. But SARA1 seemed to find no problem with the epistemic drift as he argued that NZ universities must respond to the needs of the people and help build a knowledge economy: “We reflect what people want from the universities, and as reflected in what the governments want from universities” (SARA1). Thus, SARA1 believed that research support from the university should be of benefit to the country: “We are happy to support research, but we want to see how that connects with the needs of the country.” This seemed to contradict his earlier comment that the UoA is committed to maintaining a comprehensive university because some disciplines may be less connected to the short-term needs of the country. AUT is also committed to supporting research that has an impact on the NZ economy: “We have also been clear that we are very supportive of research that relates to New Zealand” (SARA2).

Some academics agreed that it is their responsibility to make society a better place through their research activities: “I think we need to have research that is relevant for society. I do not think we can just continue practising our hobbies and expect the taxpayer to cough up money for that” (Academic1). While it is easier for the applied disciplines to make a direct impact in society, the disciplinary nature of the soft pure disciplines inhibits them from making visible impacts, which affect their ability to attract external funding. Nevertheless, the soft pure disciplines also contribute to the knowledge economy:

We engage with the knowledge economy much more in terms of critical thought and critical thinking and teaching our students and teaching the wider New Zealand society how to think about things and how to think about concepts like democracy. (Academic7)

Understanding concepts like democracy are necessary ingredients for the development of a country, though the impact may be in the long term.

Funding issues

The analysis so far shows that although there may be no strict separation between basic research and applied research, the interest of research funders to invest more in applied research may be causing an epistemic drift in the universities. Nonetheless, academics are encouraged – and some are self-motivated – by their universities (and public funding policies) to develop research-oriented relationships with external funding bodies, especially industry. But all disciplines are not the same in the race to raise funding and their need for funding. From the interviews, many of the participants agreed with the view that running a medical school, for instance, is more costly than, say, history. The academics from the various faculties seem fully aware of this variation in funding needs. In the Faculty of Arts, Academic8 commented:

Being in the Arts, particularly in Classics and Ancient History, we are traditionally a discipline that does most of our research independently in a library. We do not need money for labs; we do not need money for anything like that. We are a very cheap discipline when it comes to research. (Academic8)

Or perhaps they have far fewer external funding sources because governments tend to fund “useful” research like health, science or engineering research (Jones, 2013). The interviews revealed that funding was not a significant problem affecting the ability of academics in the soft disciplines to do research, but time was:

To be honest, I find increased administration coming from the university to some degree, also coming from the government, impacting more on my ability to do research. Because, for me, time is most important. (Academic1)

Time is, indeed, money. Not having more time for research could be compared to not having more research funding. Overall, these results indicate that academics in the soft disciplines may have to deal with time management to make way for their research duties, while those in the hard disciplines primarily have to deal with funding issues. Though funding is vital in the hard disciplines, the participants mentioned that some funding could constrain their research activities. They try to be selective with the funding sources because some external research funding does not cover the full research cost, which sometimes draws funding from the universities:

Some grants do not come with full salary recovery; they only fund the research. For example, some grants do not fund your time; they will only fund research expenses. To do any project well, you are looking to spend two to three days a week on that project, so the University is left to pick up the bill. (Academic21)

Thus, both funding and time are important factors to enhance the research activities of academics. If denied, knowledge production in universities may be affected significantly.

Discussion

Epistemic drift in universities

Epistemic drift in universities can do more harm than good because basic and applied research, as well as the Arts and Sciences, need each other. According to the literature (e.g. Bero, 2019; Calma & Dickson-Deane, 2020), most research conducted in universities today is sponsored by various bodies, including government and industry. This study sought to analyse whether and how external funding affects the ability of UoA and AUT to pursue basic research and ultimately safeguard academic disciplines and ensure they maintain or become comprehensive universities. The findings revealed that if we consider research funding conditions and allocations, government and industry are investing more in research with direct application than in basic research, which tends to take longer to prove its relevance. That confirms the arguments by scholars including Gibbons et al. (1994), Nowotny et al. (2003), and Kaldewey and Shauz (2018) that there may be a shift from basic research to more applied research. However, unlike many countries such as the United States (Slaughter & Rhoades, 2004), the “shift” in New Zealand is a gradual one as the findings revealed that, currently, public funding in basic research is still over and above that of applied research. Therefore, similar to Kyyik (2007) and Gulbrandsen and Kyyik (2010), context matters when discussing this knowledge shift.

Also, like Nowotny et al. (2003), the findings showed that this gradual shift in New Zealand resulted from the increased steering of research priorities by funders and increased commercialisation of research as seen in both Universities under study (Auckland University UniServices and AUT Venture – their commercialisation units). For this reason, disciplines like the Arts that have little or no direct application tend to suffer (Sarpong, 2021). This poses a challenge to comprehensive universities because some participants believe that the Arts are now devalued and degraded. Fewer students are also taking Arts and Humanities subjects because they are encouraged by their families (and sometimes through the allocation of government funding) to go into fields that are both traditionally better-earning and of higher status (Sturm, cited in Newton, 2018). Even more, the decline has been matched by a fall in the number of teachers in Arts subjects (Sarpong, 2021), prompting fears that those subjects are increasingly being regarded as an extravagance at a time of increasing pressures on universities' funding. This academic stratification may adversely affect a civilised and reflexive society.

The nature of discipline and funding allocation

Though both AUT and UoA seek to be comprehensive universities, expansion in the NZ research funding system is uneven and does not equally affect all disciplines. According to the findings, funding bodies' ability and willingness to fund research is not equitably distributed because the Science disciplines receive more support than the Arts disciplines. Though the participants from the Arts faculty were not perturbed about the funding inequity because they consider the Sciences to be more expensive – and indeed so –, I think that this culture of funding inequity needs revision. Owing to this, the impact on NZ society will be huge if funding bodies do not give the Arts as much attention as they give the Sciences. If this imbalance continues, it could lead to the increase of technicians – people with limited ability to make an institutional judgement – instead of professionals – people with ethical and moral ideals – (Winch, 2017). The STEM subjects are rated higher because they produce commercially viable output (Jones, 2013), which is crucial to the sustenance of the country's GDP. However, measuring success by mainly economic contributions may be disastrous because there is much more to success than just attaining economic targets. Also, society could witness many uncommitted and passionless people in the science fields because that is where opportunities are.

The Arts also contribute to the knowledge economy through teaching society about democracy, ethics and values that allows peaceful co-existence and make a country prosperous (Power, 2019). Some research areas may be left unexplored due to the shifts in the flow of government and industry resources towards the applied subjects. The funding inequity will affect society's ability to understand the world and the institutions that hold it together, as well as our understanding of societal change (Stølen & Gornitzka, 2019). For instance, as the world seeks ways to contain Covid-19, Germany “has enlisted the advice of philosophers, historians of science, theologians and jurists as it navigates the delicate ethical balancing act of reopening society while safeguarding the health of the public” (Matthew, 2020, para. 3). The Arts can help produce and transfer knowledge that ensures a sustainable society, and by devaluing them, society misses the chance to educate people on these critical issues.

Academics in the Arts also need more funding to help them in their research because more funding can buy out their growing administration and teaching roles to enable them enough time for research. This is not to suggest a separation of teaching and research duties because there can be a unity of the two (Daumiller & Dresel, 2018). For instance, AUT aims to support its academic staff in “their work of advancing knowledge and in growing the quality and value of this work, including its benefit to their teaching and students” (AUT, n.d). More investment into research in the Arts could be translated into teaching society about the basic morals of life (Stølen & Gornitzka, 2019). Thus, New Zealand as a country needs to be concerned about the different levels of attention from society to various disciplines.

The Universities must also be concerned because some funding opportunities may even draw on University funding. The findings showed that some external funders do not cover the total cost of the research they finance. Thus, an externally funded activity sometimes requires significant “in-kind” or even funding and infrastructure contributions from the universities. The external funds for specific disciplines can draw on the basic funds for all disciplines in the university (Stølen & Gornitzka, 2019). The Universities advise their academics not to apply for those funds that do not come with the full salary recovery. That poses a challenge in terms of judging which funder academics can go to and what funding they can apply. It can be suggested that there should be an awareness of the contextual pressures and managing them where possible. Academics need to engage in a cost-benefit analysis to conclude whether to apply for certain external grants.

The nature of research and funding allocation

Universities, industry and government may view research differently, which determines their attitude towards research funding. The document analysis revealed that the NZ government has put in place political agendas that direct research towards areas of economic opportunities and national needs. If government funding allocations focus primarily on national research projects, basic research may collapse (Kaldewey & Shauz, 2018). But the NZ government provides other funding such as the performance-based research funding and Marsden funding to support basic research. The findings also revealed that the Universities and faculties put strategic measures in place to enable basic researchers to carry out their curiosity-driven research. They sometimes take money from the “haves” and give it to the “have-nots” (by cross-subsidising research with teaching funding and getting funding from “rich” faculties and units). A portion of the external funding won by applied researchers sometimes supports basic researchers because the universities are aware that in a funding system over which researchers have autonomy, society can expect more from them. From the Universities perspective, every research – whether basic or applied or a combination of both – may be essential. This article shows that the increasing interest by the Universities in applied research, more than basic research, is driven by the desires of external funders.

Unlike government, industry’s investment in basic research can be minimal as the outcome usually takes many years to prove its relevance. According to Mazzucato (2011), industry collaborates with universities funded with public funding because, among other

things, the former may not want to take risks. Besides, industry mainly invests in research from which they stand a high chance of obtaining benefits, and thus focuses on applied research at the expense of basic research. However, as Neuvo (2008, p. 122) argued, “[I]t would be extremely short-sighted for a university to sacrifice its basic research for short-term industry-led projects. In doing so, the university would gradually deplete its knowledge base and so lose the interest of industry to co-operate.” NZ universities are likely to slide down on the global rankings of universities (which give high weighting to institutional research performance) and become less attractive to top-ranked staff and students, as well as funding bodies. It is another reason why momentary financial pressure should not lure universities to focus more on applied research, because it may be at their own peril.

Participants in this study think that there is a need for the right balance between basic and applied research because, as it stands now, both AUT and UoA are increasingly focusing more on applied research due to funding opportunities. In this case, funding bodies may be pushing the universities in that direction, and finding the right balance may require the efforts of universities, industry and government.

Dealing with the dichotomies

According to Martin (2012), historical evidence from universities suggests that there has been indeed a shift in the relationship between universities and society, but only concerning the relationship operating after World War II (between 1945 and 1990). Hence, the so-called “ivory tower,” where academics could pursue knowledge wherever it leads (basic research) without any control, was perhaps an era of a reward to researchers and universities for their crucial wartime contributions (Martin, 2012). After World War II, Vannevar Bush’s recommendation to the US government was to invest in basic research and expect nothing in return. Similarly, many countries also invested heavily in basic research because they trusted academics to do their jobs and know that real innovation does not hinge on strict impact agendas (Shattock, 2019). The shift in research focus can be likened to the relationship between universities and society incorporated in the nineteenth-century institutes of technology and land-grant universities – which focused on teaching practical arts such as agriculture and engineering and on enhancing industry (Labaree, 2006) – with university research becoming closer once more to direct application.

Although there is an increasing shift towards applied research in NZ, applied and basic research can co-exist. As some participants commented, their research has elements of both applied and basic research, supporting Gersbach et al. (2018), Kyvik (2007) and Stokes’ (2011) argument that academic research can be both basic and applied simultaneously. Also, university and industry research collaborations could merge basic and applied research. For instance, incremental research and product development often occur in industrial laboratories (Jones, n.d). However, in the event of breakthrough discoveries, industry scientists often need to maintain close collaboration with university scientists so that the former can gain a better understanding of the science that underlies the discovery (Jones, n.d). Furthermore, in doing so, sometimes technical problems

experienced at the cutting-edge of practice lead to new questions for research (Gann et al., 2018). Thus, university-industry collaboration can enhance both basic and applied research, and the two organisations working together should not render applied research some superiority over basic research.

Conclusion

To preserve comprehensive universities does not require a division between basic and applied research or Arts and Sciences, but their unity. Universities need to secure ample resources for the soft disciplines because research needs their contributions, as does society. Focusing on the right balance is essential because the applied disciplines alone cannot solve the challenges society faces today. The onus lies with university administrators and funding institutions to avoid the shift in access to resources, that deepens the imbalance between the soft and hard disciplines. In theory, both AUT and UoA work on building comprehensive universities that value every discipline. For instance, the University of Auckland remains committed to being a world-class university and to the concept of a comprehensive university (UoA, 2018). That should be translated into practice because building a comprehensive university will ensure that the Universities can have a formidable academic community which empowers societal progress.

Universities and their stakeholders need to consider the local and global context in the allocation and development of – ideally collaboratively – society’s programs. They need to identify which of society’s needs they can best cater to and focus on programs that meet those needs rather than pursuing programs solely to achieve instrumental purposes (Adelekan, 2020). Allowing the market to decide has led to the duplication of programs and stratification of disciplines and academics according to their “market value.” These strategies require a greater focus on central planning in government and universities on a steering core that works to secure and allocate resources for its agencies. A level of central planning can ensure that universities exercise academic autonomy in ways that are collegial and responsive to society’s needs.

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Appendices

Appendix A: Proposed interview participants

University	Faculty				JARA	SARA	Total
	Business School	Arts	Sciences	Medical and Health			
UoA	3	3	3	3	4	1	17
AUT	3	3	3	3	4	1	17
Total	6	6	6	6	8	2	34

Appendix B: Actual interview participants

University	Faculty				JARA	SARA	Total
	Business School	Arts	Sciences	Medical and Health			
UoA	3	3	4	2	2	1	15
AUT	3	2	3	1	1	1	11
Total	6	5	7	3	3	2	26

Note. The two UoA JARAs came from the Faculty of Medical and Health Sciences and the Faculty of Science. The AUT one came from the Faculty of Science.

Appendix C: Respondents and their assigned codes

Respondents	Codes
SARA (UoA)	SARA1
SARA (AUT)	SARA2
JARA (UoA): Medical & Health Sciences Faculty of Science	JARA1 JARA2
JARA (AUT)	JARA3
Academics	Academic1, Academic2, Academic3,...and Academic21

Note. Academic 1 to 3 were from Business School (UoA); Academic 4 to 6 – Business School (AUT); Academic 7 to 9 – Arts (UoA); Academic 10 to 11 – Arts (AUT); Academic 12 to 15 – Sciences (UoA); Academic 16 to 18 – Sciences (AUT); Academic 19 to 20 – Medical and Health Sciences (UoA); and Academic 21 – Medical and Health Sciences (AUT).

Appendix D: Interview questions

ACADEMICS

1. In recent times, universities are faced with the contradiction of having less government funding and the expectation to do more in areas such as publication and research degree completion (e.g., in NZ, as a prerequisite of getting more PBRF). Does this affect your role as an academic in any way and, in particular, your ability to do research?
2. In your discipline, is it expected that academics will develop research-oriented relationships with industry, public or other institutions, and if so, do you have opportunities to do this?

3. a. What type or types of research are you encouraged to do, e.g., basic or applied or elements of both? (Figure 1)
- b. Where will you position yourself in the diagram, and why?
4. a. Who defines your research agenda? (Figure 2)
- b. What kind of factors influence this choice?
5. a. How important to you is autonomy in research?
- b. If important, is there something that you do to protect it?

JUNIOR ACADEMIC RESEARCH ADMINISTRATORS

1. In recent times, universities are faced with the contradiction of having less government funding and the expectation to do more in such areas as publication and research degree completion (e.g., in NZ, as a prerequisite of getting more PBRF). Are there ways this affect your faculty's ability to do research?
2. In what ways does the work of your office support individual academics to do research?
3. a. How is the research agenda of the faculty defined? (Figure 1)
- b. What kind of factors influence this choice?
4. a. Are academics in this faculty encouraged to develop research-oriented relationships with industry, public or other institutions?
- b. What type or types of research are academics in this faculty encouraged to do, e.g., basic or applied or elements of both? (Figure 2)
5. a. Do you perceive this as influencing the research autonomy of the academics in this faculty?
- b. If so, how do you support your academics to maintain their research autonomy?

SENIOR ACADEMIC RESEARCH ADMINISTRATORS

1. In recent times, universities are faced with the contradiction of having less government funding and the expectation to do more in areas such as publication and research degree completion (e.g., in NZ, as a prerequisite of getting more PBRF). Are there ways this affects the university's ability to do research?
2. a. Does the university take into account that certain faculties have more research funding than others?
- b. If yes, does the university have an explicit strategy to encourage research in the less funded faculties?
3. In what ways does your office work with faculties to achieve the research goals of the university?
4. How does the work of your office support individual academics to do research?
5. a. Are academics in this university encouraged to develop research-oriented relationships with industry, public or other institutions?
- b. What type or types of research are academics in this university encouraged to do, e.g., basic or applied or elements of both? (Figure 1)
6. a. How is the research agenda of the university defined? (Figure 2) – the state, market/industry, the university or individual academics?
- b. What kind of factors influence the choice?

7. a. Do you perceive this as influencing the research autonomy of academics in this university?
 b. If so, how do you support your academics to maintain their research autonomy

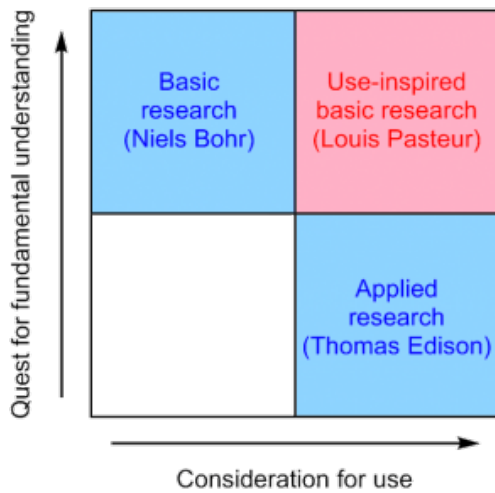
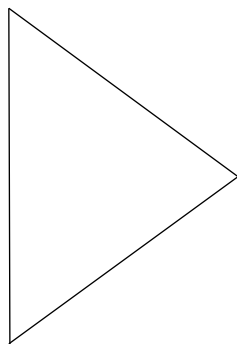


Figure 1: Stokes' Pasteur's quadrant (1997)

The extent to which you specialise only in basic or applied research or combine these activities.

Source: Cantrill, S. (2013). Speaking frankly: The allure of Pasteur's quadrant. *Nature Chemistry | The Sceptical Chymist*, 7 June. <http://blogs.nature.com/thescepticalchymist/2013/06/speaking-frankly-the-allure-of-pasteurs-quadrant.html>

State/society



University/faculty

Figure 2: Each corner of the triangle represents the extreme of one form and a minimum of the other two. Movement along this continuum is possible in either direction.

Adapted from Clark, B. R. (1983). *The higher education system: Academic organization in cross-national perspective*. Berkeley, CA: University of California Press. <https://www.ucpress.edu/book/9780520058927/the-higher-education-system>

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